

Study Area: SCE Metro

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
METRO-T-1	VINCENT 500/230 KV #1	VINCENT 500/230 kV #4	P1	T-1	<100	<100	<100	108.05	<100	<100	<100		1) Dispatch generation in LA Basin 2) Replace Vincent #1 transformer to match the rating of the #4 transformer.
METRO-T-2	LUGO – VICTORVL 500 KV #1	LUGO – ELDORDO 500 KV #1	P1	L-1	<100	<100	99.80	<100	<100	<100	115.11		Increase the rating of the line.
METRO-T-3		LUGO – ELDORDO 500 KV #1 & MOUNTAIN VIEW CC MODULE	P3	G-1/L-1	<100	<100	100.53	<100	<100	<100	116.29		
METRO-T-4	LAGUBELL – MESA CAL 230 #1	MESA CAL – LITEHIPE 230.0 #1 & MESA CAL – REDONDO 230.0 #1	P6	L-1/L-1	<100	<100	107.66	<100	<100	<100	115.85		2025 Summer Peak case: Utilize Preferred Resources and Energy Storage. 2025 SP High CEC Load case: Additional mitigation may be needed. Monitor load growth in future planning cycles.
METRO-T-5		MESA CAL – LITEHIPE 230.0 #1 & MESACALS – LAGUBELL 230.0 #2	P7	L-2	<100	<100	101.99	<100	<100	<100	109.92		
METRO-T-6		MESA 500./230 KV #3 & #4	P6	T-1/T-1	<100	<100	104.66	<100	<100	<100	112.68		
METRO-T-7	LUGO – VICTORVL 500 KV #1	LUGO – ELDORDO 500 KV #1 & MOHAVE – ELDORDO 500 KV #1 OR MOHAVE – LUGO 500 KV #1	P6	L-1/L-1	113.98	111.50	127.47	<100	<100	115.87	148.89		Increase the rating of the line.
METRO-T-8	VINCENT 500/230 KV #1	VINCENT 500/230 KV #4 & VINCENT – MESA CAL 500 KV #1	P6	T-1/L-1	N/A	N/A	112.12	N/A	N/A	N/A	119.36		1) Replace Vincent #1 transformer to match the rating of the #4 transformer .
METRO-T-9		VINCENT 500/230 kV #4 & SYLMAR1 – SYLMAR S 230 KV #1 OR PDCI MONOPOLE	P6	T-1/L-1	104.53	111.70	<100	113.53	116.38	115.87	101.64		2) System adjustment after intial or second contingency including utilizing Preferred Resources & Energy Storage.



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					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
METRO-T-10	LCIENEGA – LA FRESA 230KV #1	EL NIDO – LA FRESA 230 KV #3 & #4	P7	L-2	<100	<100	<100	103.00	<100	<100	<100		Increase pre-contingency generation in the El Nido local area.
METRO-T-11	SERRANO 500/230 KV #1, #2, OR #3	TWO SERRANO 500/230 KV TRAN.	P6	T-1/T-1	100.97	108.46	117.37	125.03	<100	123.19	126.65		1) Install a hot spare transformer 2) System adjustments after intial or second contingency including dispatching generation and Preferred Resources & Storage.
METRO-T-12	MIRALOMA 500/230 KV #4	MIRALOMA – SERRANO 500 KV #2 & LUGO – RANCHOVST 500 kV #1	P6	L-1/L-1	127.82	122.02	<100	<100	<100	128.12	<100		System adjustments after initial or second contingency including looping-in the Rancho Vista-Serrano line into Mira Loma.
METRO-T-13	MIRALOMA 500/230 KV #1 OR #2	MIRALOMA 500/230 KV #2 OR #1 & MIRALOMA – SERRANO 500 KV #2	P6	T-1/L-1	107.67	108.08	<100	<100	<100	114.56	<100		System adjustments after first or second contingency including looping-in the Rancho Vista-Serrano line into Mira Loma and energizing the spare Mira Loma 500/230 kV transformer.
METRO-T-14	BARRE – LEWIS 230 KV #1	S.ONOFRE – SERRANO 230 KV # & BARRE – VILLA PK 230 KV #1	P6	L-1/L-1	<100	<100	<100	110.90	<100	<100	<100		Dispatch generation in Orange County after intital contingency .
METRO-T-15	MIRALOMA – SERRANO 500 KV #2	LUGO – RANCHOVST 500 KV #1 & PALOVRDE – COLRIVER 500 KV #1	P6	L-1/L-1	105.65	<100	<100	<100	<100	<100	<100		Dispatch generation in LA Basin or loop-in Rancho Vista-Serrano line into Mira Loma after initial or second contingency.



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					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
METRO-T-16	MIDWAY – WIRLWIND 500 KV #3	MIDWAY – VINCENT 500 KV #1 & #2	P7	L-2	111.72	108.60	104.57	<100	<100	108.23	105.65		Reduce transfers on Path 26 within 30 minutes after the contingency.
METRO-T-17	MESA CAL – REDONDO 230KV #1	LAGUBELL – MESA CAL 230 KV #1 & LITEHIPE – MESA CAL 230.0 #1	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	101.18		Utilize available Preferred Resources & Energy Storage.
METRO-T-18	ELLIS – JOHANNA 230 KV #1	ECO – MIGUEL 500 KV #1 & OCOTILLO – SUNCREST 500 #1	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	Diverged		System adjustments after initial contingency including IV phase shifter adjustment and dispatching preferred resources.
METRO-T-19	PARDEE – SYLMAR S 230 KV #1 OR #2	LUGO – VICTORVL 500 KV & PARDEE – SYLMAR S 230 #2 OR #1	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	108.81		System adjustments after intial contingency including reducing transfers on PDCI
METRO-T-20	EAGLROCK – SYLMAR S 230 kV #1	LUGO – VICTORVL 500 KV #1 & SYLMAR S – GOULD 230 KV # 1	P6	L-1/L-1	<100	<100	<100	<100	<100	101.87	<100		System adjustments after intial contingency including reducing transfers on PDCI
METRO-T-21	SERRANO – VILLA PK 230 #1	LEWIS – SERRANO 230.0 #1 OR #2 & SERRANO – VILLA PK #2	P6	L-1/L-1	<100	<100	<100	<100	<100	<100	102.41		Utilize available Preferred Resources & Energy Storage

The Metro area 2020 SP sensitivity scenario “Summer Peak with OTC plants replaced” in Table 4-2 of the Study Plan was changed to a Summer Peak scenario with early OTC retirements (Northwest LA Basin).

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Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirement s	2025 SP High CEC Load	N/A	
Metro-VD-1	GOLETA 66 KV	S.CLARA – GOLETA #1 OR #2	P1	L-1	<5%	<5%	<5%	<5%	5%	<5%	<5%	<5%	Voltage deviation at limit. Available generators at Goletta can be used to reduce voltage deviation.

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High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	

No high/low voltage deviations identified.

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Transient Stability



ID	Contingency	Category	Category Description	Transient Stability Performance								Potential Mitigation Solutions
				2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	
METRO-TS-1	SAN BERNARDINO – ETIWANDA #1 & SAN BERNARDIO – VISTA #2, 3-PHASE FAULT AT SAN BERNARDINO	P6	L-1/L-1	Local generation unstable, San Bernardino load shed by under frequency relay	San Bernardino load shed by under frequency relay	San Bernardino load shed by under frequency relay	San Bernardino load shed by under frequency relay	San Bernardino load shed by under frequency relay	San Bernardino load shed by under frequency relay	San Bernardino load shed by under frequency relay		To be determend after further evaluation.
METRO-TS-2	ELLIS – SANTIAGO #1 & ELLIS – JOHANNA #1, 3 PHASE FAULT AT ELLIS	P6	L-1/L-1	A portion of Ellis load shed by under frequency relay	A portion of Ellis load shed by under frequency relay	A portion of Ellis load shed by under frequency relay	A portion of Ellis load shed by under frequency relay	A portion of Ellis load shed by under frequency relay	A portion of Ellis load shed by under frequency relay	A portion of Ellis load shed by under frequency relay		To be determend after further evaluation.
METRO-TS-3	ECO–MIGUEL 500 KV #1 & OCOTILLO–SUNCREST 500 KV #1, 3-PHASE FAULT AT SUNCREST (Without system adjustement after the intial contingency)	P6	L-1/L-1	None	Up to 39.8% transient voltage dip at 11 buses in SCE area including at Johanna, Valley, Villa Park, Padua, Huntington Beach and Ellis.	Up to 42.5% transient voltage dip at 14 buses in SCE area including at Johanna, Valley, Villa Park, Padua, Huntington Beach and Ellis.	None	None	Up to 42.6% transient voltage dip at 21 buses in SCE area including Johanna, Valley, Villa Park, Padua, Huntington Beach and Ellis.	Up to 46.2% transient voltage dip at 45 buses in SCE area including Johanna, Valley, Villa Park, Padua, Huntington Beach and Ellis.		To be determend after further evaluation with system adjustments after intial contingency including dispatching preferred resources.



Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	
X-SP-SLD-1												

No single contingency resulted in total load drop of more than 250 MW.

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Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Spring Light Load	2020 Summer Peak with Early OTC Retirements	2025 SP High CEC Load	N/A	
X-SP-SS-1										

No single source substation with more than 100 MW Load